1700

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: UTE NEGELE ET AL.

Serial No.: 09/058,810 Group Art Unit: 1700

Filed: APRIL 13, 1998 Examiner: V. Chen

Title: METALLIC SUBSTRATE FOR A VEHICLE BODY

REPLY

Box Non-Fee Amendment
Commissioner for Patents
Washington, D.C. 20231

Sir:

This reply is submitted in response to the Office Action dated February 17, 2000 under 37 C.F.R. § 1.111. Please amend this application as shown below.

IN THE CLAIMS

Please cancel claims 1-27 and add new claims 28-50 as follows:

-- 28. A method for corrosion-proofing a metal substrate, comprising:

applying a bond coating to the substrate, the bond coating comprising at least one organic adhesion-conferring polymer, wherein the at least one adhesion-conferring polymer comprises at least one polybismaleimide selected from the group consisting of: (i) a homopolymer comprising a bismaleimide, (ii) a homopolymer comprising a maleimide-terminated oligomer, (iii) a

homopolymer comprising a maleimide-terminated polymer, (iv) a copolymer comprising a bismaleimide, (v) a copolymer comprising a maleimide-terminated oligomer, (vi) a copolymer comprising a maleimide-terminated polymer, and (vii) a copolymer of an organic compound having a terminal functional group which can be polymerized with a maleimide residue, with the exception of conjugated double bonds, and at least one of compounds (i)-(vi); wherein the coating is applied from an aqueous solution, an organic solvent solution, a dispersion or an emulsion; and

stabilizing the bond coating on the substrate surface by heat or irradiation.

29. A method for corrosion-proofing a metal substrate, comprising:

(a) cleaning and de-greasing a substrate;

(b) applying a bond coating to the substrate, the bond coating comprising at least one organic adhesion-conferring polymer, wherein the at least one adhesion-conferring polymer comprises at least one polybismaleimide selected from the group consisting of: (i) a homopolymer comprising a bismaleimide, (ii) a homopolymer comprising a maleimide-terminated oligomer, (iii) a homopolymer comprising a maleimide-terminated polymer, (iv) a copolymer comprising a bismaleimide, (v) a copolymer comprising a maleimide-terminated oligomer, (vi) a copolymer comprising a maleimide-terminated polymer, and (vii) a copolymer of an organic

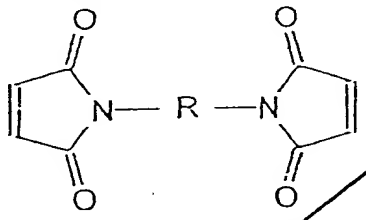
compound having a terminal functional group which can be polymerized with a maleimide residue, with the exception of conjugated double bonds, and at least one of compounds (i)-(vi);

wherein the coating is applied from an aqueous solution, an organic solvent solution, a dispersion or an emulsion;

(c) stabilizing the bond coating on the substrate surface by heat or irradiation; and

(d) applying at least one paint coating on the substrate.

30. The method according to Claim 29, wherein the bismaleimide has the formula:



wherein R is a residue selected from the group consisting of:

(A) a linear, substituted C_1-C_6 hydrocarbon;

(B) a linear, unsubstituted C_1-C_6 hydrocarbon;

(C) a cyclic, substituted C_3-C_6 hydrocarbon;

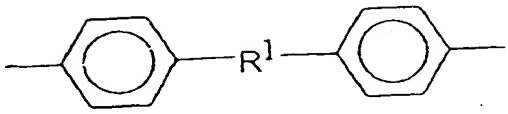
(D) a cyclic, unsubstituted C_3-C_6 hydrocarbon;

(E) a phenylene residue;

(F) a biphenyl residue;

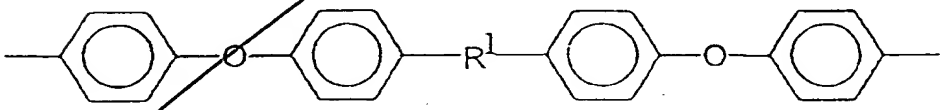
(G) a triazole;

(H) a compound with the formula:



wherein R^1 is selected from the group consisting of CH_2-, -O-, -C(=O)-, $-C(CF_3)_2$-, -S-, -S-S-, -SO- and $-SO_2$-; and

(I) a compound with the formula:



wherein R^1 is selected from the group consisting of CH_2-, -O-, -C(=O)-, $-C(CF_3)_2$-, -S-, -S-S-, -SO- and $-SO_2$-.

31. The method according to Claim 29,wherein the maleimide-terminated polymer is selected from the group consisting of:

(A) a phenol resin;

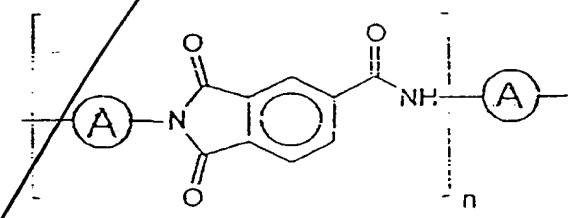
(B) a polyamide;

(C) a polyether ketone;

(D) a polyether sulfone;

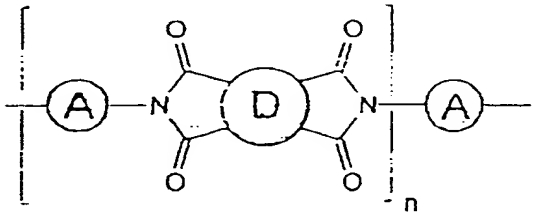
(E) a polyester;

(F) a polydiamide of a polyfunctional acid, particularly with the formula:



wherein A stands for diamine; and

(G) a polydianhydride of a polyfunctional acid, particularly with the formula:



wherein A stands for diamine and D for dianhydride.

32. The method according to claim 29, wherein the organic compound is selected from the group consisting of:

(A) a polymerizable unsaturated monomer;

(B) a polymerizable unsaturated oligomer;

(C) a polymer;

(D) a compound containing an amino group;

(E) a compound containing a thio group;

(F) a compound containing allylic double bonds;

(G) a cyanate compound;

(H) an isocyanate compound;

(I) an epoxide;

(J) an alkylcarboxylic acid;

(K) an arylcarboxylic acid;

(L) an alkylphosphonic acid; and

(M) an arylphosphonic acid.

33. The method according to Claim 32, wherein the organic compound has one or two functional groups.

34. The method according to claim 29, wherein the bond coating is applied in a thickness of from 10 to 5,000 nm.

35. The method according claim 29, wherein the organic solvent solution, aqueous solution, dispersion, and emulsion have concentrations of from 5 to 30 weight percent.

36. The method according to claim 29, wherein before applying the bond coating, at least one catalyst is added to the bond coating.

37. The method according to claim 36, wherein the at least one catalyst is selected from the group consisting of organic peroxides and ionic catalysts.

38. The method according to claim 29, wherein before applying the bond coating, at least one auxiliary agent is added to the bond coating.

39. The method according to claim 38, wherein the at least one auxiliary agent is selected from the group consisting of dispersants and emulsifiers.

40. The method according to claim 29, wherein the bond coating is stabilized by heat at a temperature from 50°C to 250°C.

41. The method according to claim 29, wherein the bond coating is stabilized by heat at a temperature from 80°C to 200°C.

42. The method according to claim 29, further comprising, before applying the bond coating, applying a thin organic film comprising at least one organic compound containing a polymerizable functional group, and stabilizing the thin organic film by heat.

43. The method according to Claim 42, wherein the thin organic film is selected from the group consisting of an

aqueous solution, organic solution, dispersion, and an emulsion.

44. The method according to Claim 43, wherein the concentration of the solution is from 0.05 to 3 weight percent.

45. The method according to one of Claims 42, wherein the organic film is stabilized by heat at temperatures from 20°C to 200°C.

46. The method according to claim 42, wherein the organic film is stabilized by heat at temperatures from 70°C to 140°C.

47. The method according to claim 42, further comprising applying a top coating to the substrate after step (c).

48. The method according to claim 29, wherein the substrate is selected from the group consisting of steel, aluminum, galvanized steel and magnesium.

49. The method according to claim 29, the substrate is selected from the group consisting of a vehicle body, an